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ORIGINAL ARTICLE

Social inequality and smoking in young Swiss men: intergenerational transmission of cultural capital and health orientation

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Abstract
Objectives Smoking is related to income and education and contributes to social inequality in morbidity and mortality. Socialisation theories focus on one's family of origin as regards acquisition of norms, attitudes and behaviours. Aim of this study is to assess associations of daily smoking with health orientation and academic track in young Swiss men. Further, to assess associations of health orientation and academic track with family healthy lifestyle, parents' cultural capital, and parents' economic capital.
Methods Cross-sectional data were collected during recruitment for compulsory military service in Switzerland during 2010 and 2011. A structural equation model was fitted to a sample of 18- to 25-year-old Swiss men ($N = 10{,}546$).
Results Smoking in young adults was negatively associated with academic track and health orientation. Smoking was negatively associated with parents' cultural capital through academic track. Smoking was negatively associated with health orientation which in turn was positively associated with a healthy lifestyle in the family of origin.
Conclusions Results suggest two different mechanisms of intergenerational transmissions: first, the family transmission path of health-related dispositions, and secondly, the structural transmission path of educational inequality.

Keywords Smoking · Young adults · Social inequalities · Socialisation theory

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Introduction

Smoking is a main cause of morbidity and mortality in industrialised countries (e.g. Peto 1994). It has a negative relationship with socio-economic position (SEP) in adolescents and adults (Power et al. 2005; Hanson and Chen 2007). Smoking contributes substantially to the social patterning of mortality (Galobardes et al. 2004; Stringhini et al. 2010) and morbidity (Laaksonen et al. 2005; Kestila et al. 2009). Two complementary pathways have been suggested in the literature which may help to explain the links between parental SEP and smoking in young adulthood (Cockerham 2005; Lahelma 2005).

Intergenerational transmission of SEP

Own educational attainment is the most prominent factor contributing to the social patterning of smoking, compared with parents' education, occupation or income (Hanson and Chen 2007). However, own educational attainment is itself strongly and positively associated with parents' education in many industrialised countries (OECD 2010). Therefore, SEP can be transmitted from one generation to the next and thus affect smoking status through own educational attainment (Paavola et al. 2004; Kvaavik et al. 2012).

Socialisation effects

Socialisation theory posits that health-related dispositions and behaviours are transmitted across generations. Socialisation refers to the process of acquiring dispositions including norms, values and beliefs which enable and shape individual behaviours. For example, anti-smoking parenting practices during childhood attenuate risk factors for smoking in adolescence (Jackson and Dickinson 2011).

Socialisation is an ongoing process which takes place both in one's family of origin and in educational institutions during childhood and adolescence (Singh-Manoux and Marmot 2005). A materialistic version of socialisation theory would suggest that parental SEP is associated with own smoking through the acquisition of class-related health-relevant dispositions. Drawing upon Bourdieu (1984), Singh-Manoux and Marmot (2005) argued that the process of socialisation "provides the individual with class-dependent and predisposed ways of thinking, feeling and acting" (p. 2130). In Bourdieu's terms, SEP is understood as the amount of economic, cultural and social capital which a person can readily access (Bourdieu 1986; Williams 1995; Abel 2008). Economic capital refers to the income and assets of a person, whereas cultural capital refers to his or her educational credentials, vocational skills and cultural possessions. Social capital refers to social ties which allow a person to access resources located in social networks (Bourdieu 1986).

A person's dispositions such as norms, values and beliefs are shaped by socialisation processes which are based on his or her access to economic and cultural capital (Bourdieu 1984, 1986). Previous studies found an association of SEP with health-relevant dispositions which, in turn, were associated with smoking. Individual beliefs about smoking are both socio-economically patterned and associated with smoking (Huisman et al. 2012). Also, other health-relevant dispositions such as high self-efficacy to quit smoking and internal locus of control are socio-economically patterned and negatively associated with smoking (Wardle and Steptoe 2003; Siahpush et al. 2006). In this study, health orientation is seen as a health-related disposition which might reduce the likelihood of smoking. The question then arises whether health orientation is linked with one's own and parents' SEP and consequently contributes to social inequalities in smoking.

The aim of this study was threefold: first, to estimate the associations between smoking, health orientation and SEP in young Swiss men; secondly, to assess whether socio-economic differences of health orientation in young adults are present; and thirdly, to estimate whether own education and health orientation contribute to the intergenerational transmission of social inequalities in smoking. Daily smoking was previously and consistently found to be socially patterned in young Swiss adults (Michaud et al. 2006).

Methods

The study used data from the Swiss Federal Surveys of Adolescents on men aged 18–25 years ($M = 19.7$, $SD = 1.1$). Data collection was conducted in 2010 and 2011. It took place during recruitment for compulsory military service at all six national recruiting centres in Switzerland. The target population consisted of Swiss male citizens. The survey was administered as a paper-and-pencil questionnaire in a classroom setting. It was administered exclusively by non-military staff and collection and processing methods ensured that no information was revealed to members of military staff. Participation was voluntary and anonymous. All variables were based on self-reports. A total of $N = 31{,}424$ cases were collected. A supplementary questionnaire on health-relevant behaviours was administered to a randomly selected subsample of one-third of the participants. We analysed the data which were collected with the supplementary questionnaire ($N = 10{,}740$). Because local administrative records do not provide detailed information on the numbers of participants in the recruitment, the exact response rate could not be calculated. Reports from field staff showed that refusals were rare. Also, a recent study in two of those recruitment centres using a very similar sampling procedure reported a 95 % response rate (Dermota et al. 2013). For additional information on the sample, we calculated the proportion of the eligible population on the basis of data from the register survey of the Swiss census. Our sample corresponded to 14 % of the eligible population. The analyses were based on the total of cases which had fewer than five missing variables ($N = 10{,}546$). The survey design and translation procedure have been described elsewhere (Hofmann et al. 2013).

Variables and constructs

The main outcome variable was current smoking status, categorised as daily smoking (defined as smoking at least one cigarette per day), vs. not smoking or occasionally smoking (defined as smoking less than one cigarette per day). Smoking was dichotomised because preliminary analyses showed that occasionally smoking was not associated with the independent and intermediate variables.

Independent variables were parents' cultural capital and parents' economic capital. Parents' cultural capital was measured by (1) highest achieved education of both father and mother (ISCED 1997), and (2) the number of books in the home of the parents. Previous research showed that the number of books in the home is a reliable and valid indicator for cultural capital (Iversen and Holsen 2008; Evans et al. 2010). Parents' economic capital was measured by (1) retrospective perceived family financial conditions during primary school between age 6 and 12 years and (2) current perceived family financial conditions. Current and past family financial conditions were measured by asking: How is/was the financial condition of your family (during primary school)? with four answer categories ranging from

very poor to very good. The third indicator for parents' economic capital was (3) current equivalent household income (square root scale).

Intermediate variables were young adult academic track, family healthy lifestyle and young adult health orientation. Young adult academic track was measured by (1) school level in grade 9 (the last year of compulsory schooling; retrospective) and (2) academic track following compulsory schooling (retrospective), categorised as unemployment, vocational training and grammar school. Those who reported having entered the workforce following compulsory schooling (1 %) were coded as attending vocational training. The third indicator for academic track was (3) current or expected level of post-mandatory education. Family healthy lifestyle was measured by asking: How important is a healthy lifestyle in the family in which you grew up? with four answer categories ranging from not important at all to very important. Young adult health orientation was measured by (1) perceived importance of leading a healthy life (value) (Shell Deutschland Holding 2006), (2) perceived scope for living a healthy life for their age (scope) (Anand and van Hees 2006; Hofmann et al. 2013) and (3) interest in health matters.

All independent and intermediate variables were latent, except for family healthy lifestyle which was manifest. The categories of all variables and their proportions of missing values are given in Table 1. Most variables had fewer than 5 % missing values (range 0.7–3.5 %). The following SEP measures, however, had 7.1–19.8 % of missing variables: academic track following grade 9, father's and mother's education and household equivalent income. To account for the elevated proportions of missing values, we chose a multiple imputation approach (Enders 2010), which is described below.

Structural model

The hypothesised model is presented in Fig. 1. Daily smoking was regressed on young adult health orientation [hypothesis 1 (H1)] and young adult academic track (H2). On the basis of theory and previous findings, we hypothesised that smoking is negatively associated with health orientation (Wardle and Steptoe 2003; Siahpush et al. 2006; Huisman et al. 2012). Based on previous findings, we expect that smoking is negatively associated with education in young adults (Michaud et al. 2006).

Young adult academic track was regressed on parents' cultural capital (H3) and parents' economic capital (H4) to test whether educational inequalities were transmitted from the parents to the young adults. In the light of previous evidence (Buchmann et al. 2007), we hypothesised that young adult academic track is positively associated with the cultural and economic capital of their parents.

Young adult health orientation was regressed on young adult academic track (H5). On the basis of socialisation theory (Singh-Manoux and Marmot 2005), we hypothesised that health orientation is positively associated with academic track. Further, young adult health orientation was regressed on parents' cultural capital (H6) and parents' economic capital (H7). Given the socialisation theory (Singh-Manoux and Marmot 2005), we expected a positive association of health orientation with both parents' cultural and parents' economic capital. This association reflects socio-economic differences in socialisation with respect to health orientation. Also, young adult health orientation was regressed on family healthy lifestyle (H8). Again, given socialisation theory, we expect a positive association between health orientation and family healthy lifestyle to reflect the socio-cultural differences in socialisation.

Finally, family healthy lifestyle is regressed on parents' cultural capital (H9) and parents' economic capital (H10). Again in the light of socialisation theory, we expected that family healthy lifestyle is positively associated with parents' SEP.

We tested for the following latent variable interaction effects: interaction of parents' cultural capital with parents' economic capital on young adult academic track, young adult health orientation and family healthy lifestyle; interaction of young adult academic track with young adult health orientation on young adult smoking.

Estimation procedure

The SEM was fitted with Mplus 6.12 using the WLSMV estimator which accounts for ordinality of the manifest variables (Muthén and Muthén 1998–2010). The estimation is based on the polychoric correlation matrix reported in Table 2. The WLSMV estimator is known to yield biased parameter estimates if data are missing at random. Therefore, analyses were carried out on 20 multiply imputed datasets, taking into account ordinality of the indicators (Enders 2010).

Standardised probit regression coefficients are reported for the associations of young adult academic track and health orientation with the dichotomous outcome variable daily smoking. These coefficients can be expressed as probabilities of being a smoker vs. being a non-smoker when the predictors are at the mean, or one standard deviation above or below the mean (Muthén and Muthén 1998–2010). Finally, total effects are calculated as the sum of the direct and all indirect effects.

Results

The proportions of manifest variables by smoking status are given in Table 1. These proportions are based on the

Table 1 Sample characteristics by smoking status and proportions of missing values, Switzerland, 2010–2011

	Daily smoking				Daily smoking		
	No	Yes	Total		No	Yes	Total
Daily smoking	70.1	29.9	100.0	Current level of education			
Missing values			3.4	Lower secondary	5.6	13.2	7.9
Value: leading a healthy life				Vocational training	54.1	67.7	58.1
Unimportant	7.5	13.0	9.1	Grammar school	34.4	15.8	28.9
	13.0	23.6	16.2	Tertiary education	5.9	3.3	5.1
	21.1	21.2	21.1	Total	100.0	100.0	100.0
	31.9	21.6	28.8	Missing values			1.5
Very important	26.5	20.6	24.8	Mother's education			
Total	100.0	100.0	100.0	Lower secondary	5.4	8.4	6.3
Missing values			1.8	Vocational training	61.0	62.0	61.3
Scope: leading a healthy life				Grammar school	6.6	5.9	6.4
Do not agree	1.5	3.6	2.1	Tertiary applied	11.7	11.3	11.6
	6.6	16.1	9.5	Tertiary university	15.3	12.4	14.4
	12.9	17.5	14.3	Total	100.0	100.0	100.0
	34.7	27.8	32.6	Missing values			14.8
Agree totally	44.3	35.0	41.5	Father education			
Total	100.0	100.0	100.0	Lower secondary	3.2	4.1	3.4
Missing values			1.3	Vocational training	48.9	53.5	50.3
Interest in health matters				Grammar school	3.6	3.7	3.6
Not interested	25.0	29.6	26.4	Tertiary applied	20.1	19.7	20.0
Rather interested	48.3	47.2	47.9	Tertiary university	24.2	19.0	22.7
Very interested	26.7	23.2	25.7	Total	100.0	100.0	100.0
Total	100.0	100.0	100.0	Missing values			13.2
Missing values			3.5	Number of books in home			
Parent healthy lifestyle				0–10	8.6	12.7	9.8
Not important	9.1	13.6	10.4	11–50	28.3	32.6	29.6
Rather important	43.1	46.7	44.2	51–200	30.4	28.6	29.9
Very important	47.8	39.7	45.4	201–400	17.2	12.6	15.8
Total	100.0	100.0	100.0	>400	15.5	13.5	14.9
Missing values			0.7	Total	100.0	100.0	100.0
School level in grade 9 (retrospective)				Missing values			0.7
Special education	1.5	3.1	2.0	Family financial condition (retrospective)			
General secondary	25.6	38.5	29.4	Moderate	22.3	25.6	23.3
Interm. secondary	43.4	42.3	43.1	Decent	59.7	54.4	58.1
Grammar school	29.5	16.1	25.5	Very good	18.0	20.0	18.6
Total	100.0	100.0	100.0	Total	100.0	100.0	100.0
Missing values			2.5	Missing values			1.0
Academic track following Grade 9 (retrospective)				Family financial condition (current)			
Unemployed	0.6	2.0	1.0	Moderate	19.9	25.7	21.6
Vocational training	69.6	82.1	73.3	Decent	60.4	55.0	58.8
Grammar school	29.8	15.9	25.7	Very good	19.7	19.3	19.6
Total	100.0	100.0	100.0	Total	100.0	100.0	100.0
Missing values			7.1	Missing values			1.8
				Household equivalent income			
				CHF 750–2,500	12.9	13.8	13.2
				CHF 2,501–5,000	36.8	38.3	37.2
				CHF >5,000	50.3	47.9	49.6

Table 1 continued

	Daily smoking				Daily smoking		
	No	Yes	Total		No	Yes	Total
				Total	100.0	100.0	100.0
				Missing values			19.8

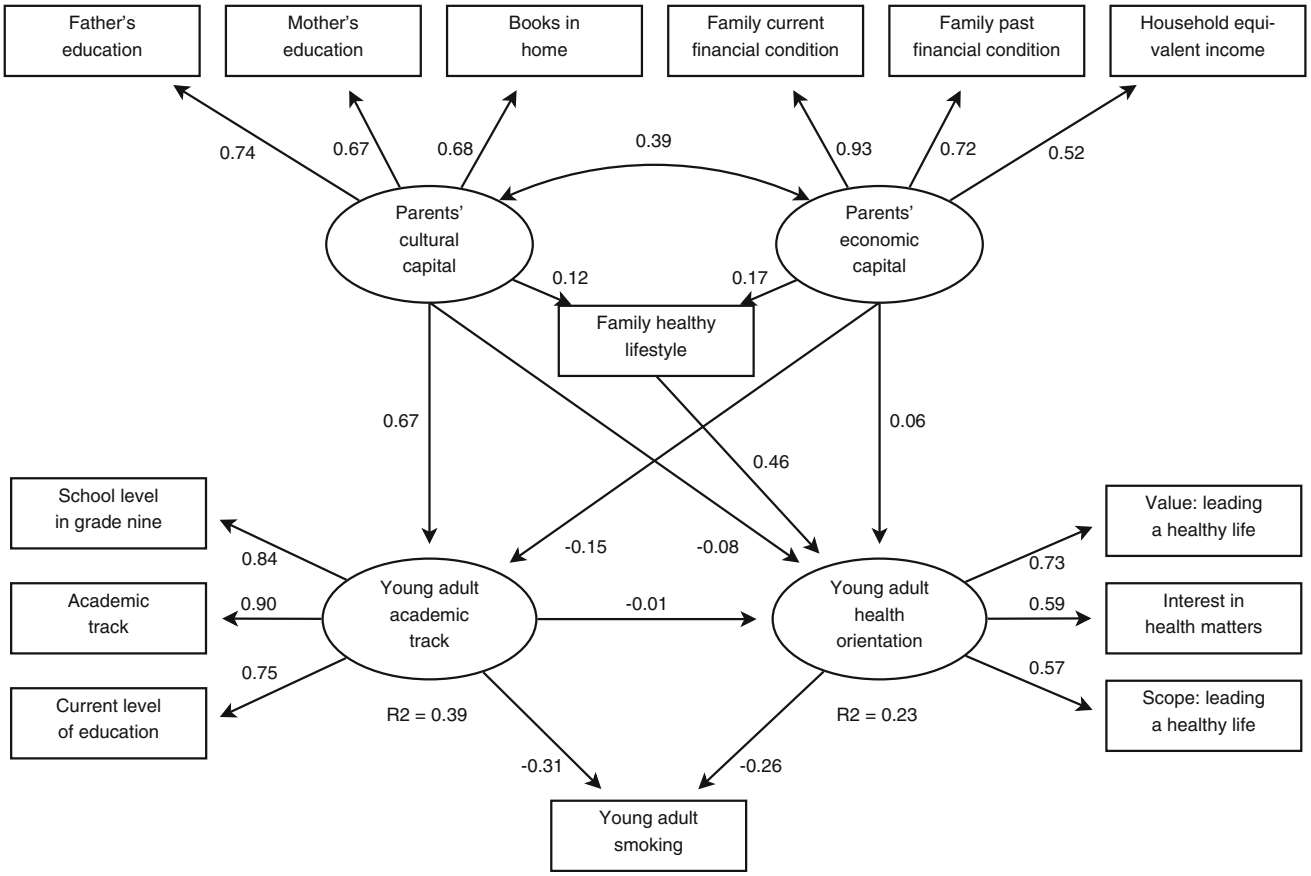

Fig. 1 Model results, completely standardised factor loadings and regression coefficients for Switzerland, 2010–2011

raw data before the multiply imputed datasets were generated. Thirty per cent of young adults in our sample are smokers. Note that the proportion of young adults in tertiary education is very low because recruitment for compulsory military service typically takes place as soon as vocational training or grammar school is completed. Usually, this is before young adults take up tertiary education.

Model fit

Fit indices were calculated by the mean values across all 20 imputed datasets. The pooled χ^2 index was 1,714.62 with 68 degrees of freedom. This indicates that the correlation matrix could not be reproduced exactly by the hypothesised model. The model should not be rejected on that basis, however, because it is widely acknowledged that the χ^2 test is highly sensitive in large samples (Brown 2006). Pooled incremental model fit indices indicate good model fit: RMSEA = 0.048, CFI = 0.977, TLI = 0.969. Modification indices suggested minor misspecifications of the latent variables. No modifications were specified based on these results because no suggested modification had any reasonable theoretical basis.

Parameter estimates

The standardised factor loadings are given in Fig. 1. Factor loadings ranged between 0.52 and 0.93, which is larger than the recommended threshold of 0.4 (Brown 2006).

Table 2 Correlation matrix of observed variables (polychoric correlations), Switzerland, 2010–2011

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Daily smoking													
2 Value: leading a healthy life	−0.20**												
3 Scope: leading a healthy life	−0.22**	0.38**											
4 Interest in health matters	−0.08**	0.48**	0.30**										
5 Parent healthy lifestyle	−0.13**	0.32**	0.34**	0.27**									
6 School level in grade 9 (retrospective)	−0.25**	0.03**	0.01	−0.12**	0.06**								
7 Academic track following grade 9	−0.27**	0.07**	−0.02	−0.04**	0.06**	0.75**							
8 Current level of education	−0.31**	0.04**	0.02	−0.09**	0.08**	0.63**	0.68**						
9 Mother's education	−0.09**	0.04**	0.04**	−0.02	0.10**	0.31**	0.36**	0.27**					
10 Father's education	−0.09**	0.03*	0.04**	−0.04**	0.13**	0.35**	0.39**	0.32**	0.55**				
11 Number of books in home	−0.11**	0.02*	0.04**	−0.05**	0.18**	0.40**	0.44**	0.35**	0.43**	0.45**			
12 Family financial condition (retrospective)	−0.02**	0.07**	0.14**	0.02*	0.16**	0.07**	0.07**	0.04**	0.18**	0.26**	0.16**		
13 Family financial condition (current)	−0.07**	0.06**	0.17**	0.01	0.20**	0.07**	0.05**	0.07**	0.20**	0.28**	0.17**	0.68**	
14 Household equivalent income	−0.04*	0.02	0.07**	−0.03*	0.10**	0.12**	0.04**	0.10**	0.19**	0.25**	0.17**	0.28**	0.49**

* $p < 0.05$, ** $p < 0.01$

All standardised latent variable interaction effects were lower than 0.1 and did not contribute more than 1 % to the explained variance of the outcomes.

Completely standardised regression coefficients are given in Fig. 1. Owing to the large sample size, all coefficients but one was significantly different from zero at the $p < 0.001$ level. The regression coefficient of health orientation on academic track was not significant ($p > 0.05$). In this situation, effect sizes rather than p values should be considered. First, the regression coefficients between the latent variables (i.e. direct effects) are reported, starting with daily smoking as the main outcome. Next, total effects of parents' cultural and economic capital on young adult health orientation and daily smoking are reported.

Direct effects

Smoking was negatively and moderately associated with both young adult health orientation (H1) and young adult academic track (H2). The estimated probability of daily smoking was 0.30 when young adult health orientation was held constant at the mean. At one standard deviation below and above the mean of health orientation, the estimated probabilities of smoking were 0.40 and 0.22, respectively. Likewise, the estimated probability of smoking was 0.30 for young adults when academic track was held constant at the mean. At one standard deviation below or above the mean of academic track, the probabilities of smoking were 0.42 and 0.20, respectively. Effect sizes of health orientation and academic track were similar, indicating that both variables contributed comparably to the probability of daily smoking. These results confirm our initial hypotheses (H1 and H2).

We found a strong positive association between young adult academic track and parents' cultural capital (H3). This finding was expected and reflects the transmission of educational attainment from the parents to the young adults. Academic track was weakly associated with parents' economic capital (H4). Contrary to what we expected, this association was negative, although the bivariate correlation coefficient was positive (0.11). This is a suppression effect which is likely to arise in models with latent variables because the correlations among the variables are not attenuated by measurement errors (Lau and Cheung 2010). The effect is interpreted as follows: when parents' cultural capital is held constant, being on a high-level academic track is associated with less economic capital.

Young adult health orientation was regressed on young adult academic track (H5), parents' cultural capital (H6) and economic capital (H7), and on family healthy lifestyle (H8). Young adult health orientation was positively associated only with family healthy lifestyle. This association was expected and represents the transmission of health-related dispositions from the parents to the young adults. The remaining regression coefficients were close to zero, which means that health orientation was neither positively nor negatively associated with academic track and parents' cultural and economic capital. These findings were not expected, according to our initial hypotheses (H5–H7).

Finally, family healthy lifestyle was regressed on parents' cultural capital (H9) and parents' economic capital (H10). The associations were in the expected direction, but the regression coefficients were quite small. They would probably be larger if family healthy lifestyle could have been measured as a latent variable instead of a single manifest variable.

Total effects

The total effects for smoking and health orientation are reported below.

Daily smoking

The standardised regression coefficient for the total effect of parents' cultural capital on young adult daily smoking was −0.20. The single most important path for this association led from parents' cultural capital to young adult academic track and from there to young adult daily smoking. We found, however, no evidence for an association of parents' economic capital with young adult smoking (the standardised regression coefficient for the total effect being 0.01).

Young adult health orientation

Parents' cultural capital and young adult health orientation were not associated in our model, but the total effect of parents' economic capital on young adult health orientation was 0.14. If interpreted cautiously, it shows that young adult health orientation might be positively associated with parents' economic capital.

Discussion

The aim of the study was to estimate the associations of smoking in young Swiss men with their health orientation and SEP (1); to assess whether socio-economic differences of health orientation in young adults were present (2); and to estimate whether own education and health orientation contribute to the intergenerational transmission of social inequalities in smoking (3).

Smoking prevalence was 30 %, which is comparable to other Swiss data on young adult smoking (Keller et al. 2011; Radtke et al. 2011; Dermota et al. 2013). Smoking was negatively associated with young adult health orientation and young adult academic track. Young adult health orientation and young adult academic track were not associated with each other. Furthermore, young adult smoking was negatively associated with parents' cultural capital via young adult academic track. Young adult health orientation was positively associated with family healthy lifestyle and weakly, but positively associated with parents' economic capital. Young adult health orientation was not associated with parents' cultural capital.

Two different mechanisms of intergenerational transmissions relevant to smoking were observed: first, the family transmission path of dispositions, and secondly the structural transmission path of educational inequality. Both mechanisms appear to be independent of each other to a remarkable degree.

Family transmission path of dispositions

Young adult health orientation was positively associated with family healthy lifestyle and weakly, but positively associated with parents' economic capital. First, this suggests that the young adults, after being socialised within their family, were not further influenced by academic track. Hence, the conditions associated with the educational system and the different academic tracks do not appear to generate inequalities regarding young adult health orientation. Pre-existing inequalities were not further aggravated within the educational system. Secondly, and to a lesser degree than might be expected from theory, young adult health orientation and family healthy lifestyle were positively associated with parents' economic capital. Effect sizes, however, do not provide enough evidence to support the materialistic version of the socialisation hypothesis. Hence, we think that young adult health orientation is fairly independent of the socio-economic status of the family of origin and more tied to family healthy lifestyle.

Structural transmission path of educational inequality

We found a negative association of smoking with academic track which was not affected by health orientation. Therefore, we suggest that this association might be linked to contextual factors associated with different academic tracks rather than to dispositional factors. One of these factors may be that smoking might be seen as an adult behaviour which is adopted earlier by adolescents attending vocational training than by those attending grammar school (Michaud et al. 2006). Also, peer effects might differ between academic tracks. Finally, we found that daily smoking was negatively associated with parents' cultural capital, but not associated with parents' economic capital. This is consistent with previous studies which found that the association of SEP and smoking was less pronounced when income or family affluence was used as indicators instead of education (Hanson and Chen 2007; Richter et al. 2009).

The choice between vocational training and grammar school for post-mandatory education at the age of 16 years appears to be crucial to the structural path of educational inequality. Adolescents are introduced into different social environments in which they are more likely or less likely to become a smoker in young adulthood. We think that this might very well be a mechanism by which socio-economic differences in health-relevant behaviours are reproduced across generations.

These results suggest that health promotion activities which are targeted at reducing social differences in smoking should focus on the setting of vocational training programmes because young adults in vocational training appear to be more at risk of daily smoking than their counterparts in grammar school.

Strengths and limitations

A major strength of this study is that a considerable proportion of young Swiss men from all regions and socio-economic strata were included in the sample. Unemployed (5.9 %) and young adults not attending post-mandatory education (5.6 %) were also included. Because the sample was taken during recruitment for compulsory military service and included persons fit for military service, persons unfit for military service and persons opting for civilian alternative service, the sample is considered representative of the age group of 18- to 25-year-old men with Swiss citizenship.

Structural equation modelling with latent variables provides several advantages over multivariate regression modelling. First, because latent variables are not affected by measurement errors, correlations among latent variables are stronger than among manifest variables (Brown 2006). This is crucial because some indicators in our dataset are especially liable to measurement error (e.g. household income). Secondly, complex relationships can be estimated in one single model. Thirdly, the SEM environment offers advanced multiple imputation techniques for missing values (Enders 2010). This is a crucial advantage over list-wise deletion of variables when the pattern of missingness in the outcome variable might be associated with the predictor variables.

Some limitations have to be mentioned to facilitate an adequate interpretation of the model. First, owing to the sampling procedure in recruitment centres, it was not possible to include females, non-Swiss citizens and people with severe disability in the study. Further research should include those groups to allow for analyses on differences in gender, nationality and disability status. Secondly, the dataset contained exclusively cross-sectional data and self-assessed measures. Therefore, causal interpretations should be made with caution. It might well be that the decision for an educational track might have been affected by smoking status (Koivusilta et al. 1998). We would argue, however, that this problem is overcome to a certain degree by the inclusion of retrospective data on parents' cultural capital which is not likely to be affected by this effect. Furthermore, daily smoking might have influenced the perception of participants' health orientation. Although this cannot be completely ruled out, it does not seem likely because the items on health orientation were not specifically related to smoking.

Thirdly, self-reports are susceptible to bias in social desirability. The indicators on cultural and economic capital, however, should be less sensitive to social desirability bias than values and attitudes. Moreover, validity and reliability were demonstrated for retrospective self-reports of childhood SEP (e.g. Krieger et al. 1998) and self-reports of smoking status (e.g. Patrick et al. 1994).

Fourthly, we could not take into account contextual factors such as parents' and peer smoking behaviour and social networks at school or work because such variables were not included in the survey. Also, psychosocial and personal variables (e.g. self-efficacy or locus of control) were not included in the model.

Conclusion

The results suggest that a positive health orientation is protective for daily smoking. Moreover, taking an apprenticeship vs. attending grammar school is a risk for daily smoking. This elevated risk is probably due to factors which are related to the social context of vocational training. These contextual factors might include a higher proportion of smoking peers, an earlier adoption of adult behaviours or work environments which are more smoke-friendly. To lower this risk, efforts in health promotion should specifically be directed to these settings and conditions. Furthermore, more research is needed to disentangle these effects. Therefore, data on parents' smoking status, peer smoking behaviour and work environment factors would be desirable in the future.

With respect to health orientation, the present results suggest that the transmission of dispositions within the family might be more important than socio-economic factors. First of all, this would indicate that differences in daily smoking owing to health orientation are not related to SEP and that they only contribute weakly to the socio-economic patterning of smoking in young adults. As a positive health orientation appears to be protective against daily smoking, however, it would seem desirable to develop effective measures to promote a positive health orientation in all social strata.

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